

Lockheed Martin Idaho Technologies Company

INTERDEPARTMENTAL COMMUNICATION

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To: Glenn R. Rodman MS 7113 3-4314

From: Rosanna Chambers MS 3960 6-7729

Subject: MARSSIM INVESTIGATION FOR CPP-709 RADIONUCLIDES – RC-10-98

- References:**
- (a) J.A. Daley and JW Rogers, *RML Gamma Ray Analysis of Samples Collected in Support of the Field Sampling Plan for the Decommissioning and Dismantling of CPP-709 at the INEEL*, INEEL/INT-98-00723, 1998
 - (b) R.K. Hague, et al., *Decontamination and Dismantlement of CPP-709*, INEEL/INT-98-00773, 1998
 - (c) S.M. Rood, G.A. Harris, and G.J. White, *Background Dose Equivalent Rates and Surficial Soil Metal and Radionuclide Concentrations for the Idaho National Engineering Laboratory*, INEL-94/0250, Rev. 1, August 1996
 - (d) J. Fromm, *Radionuclide Risk-Based Concentration Tables*, Memorandum to INEL Wag Managers and Technical Support Staff, January 3, 1996
 - (e) *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)*, NUREG-1575, EPA 402-R-97-016, December 1997

Table 1 lists statistics for the radionuclides measured at CPP-709 (References a and b). Included for each radionuclide are the maximum measured concentration, the minimum measurement used to determine the INEEL background (Reference c) and the derived concentration guideline level (DCGL) (the 10^{-4} risk-based concentration (Reference d)). One Cs-137 measurement from "floor sweepings" was more than 2.5 times the 10^{-4} risk-based concentration for that radionuclide. Based on the assurance that this debris would be removed before demolition and on guidance in Reference e, CPP-709 meets the release criteria for radionuclides.

Table 1. CPP-709 Radionuclide Statistics.

Radionuclide	Data Points	Maximum CPP-709 Concentration (pCi/g)	Minimum Background Measurement (pCi/g)	DCGL 10^{-4} Risk-Based Concentration (pCi/g)	Release Criterion Met
Am-241	5	2.3E-02 ± 3.4E-03	0.0019	2.9E+02	Yes
Sb-125	1	3.6E-01 ± 7.0E-02		1.4E+12	Yes
Cs-137	4	1.1E+01 ± 8.0E-01	0.0099	2.3E+01	Yes
Co-60	1	9.4E-02 ± 1.9E-02		7.4E+05	Yes
Pu-238	4	2.9E-02 ± 4.5E-03	-4.6E-05	6.7E+02	Yes

Pu-239/240	4	1.9E-03 ± 8.4E-04	-0.0046	2.5E+02	Yes
Sr-90	4	2.8E-01 ± 1.0E-01	0.010	2.3E+04	Yes
U-234	4	2.0E-02 ± 1.0E-02	0.708	1.8E+03	Yes
U-235	4	2.1E-03 ± 3.5E-03		1.3E+01	Yes
U-238	4	2.3E-02 ± 1.1E-02	0.80	6.7E+01	Yes

Tables 2 and 3 are reproduced from Reference e, page 8-9, and summarize statistical tests for determining whether the radionuclides at CCP-709 meet release criteria. INEEL background information is not available for several of the radionuclides listed in Table 1. They are Sb-125, Co-60, and U-235. For each of these, the maximum measurement from CPP-709 was less than the risk-based criterion. Therefore, according to Table 2, these radionuclides meet the release criteria.

The radionuclides with available background information are Am-241, Cs-137, Pu-238, Pu-239/240, Sr-90, U-234, and U-238. Table 3 states that if the largest survey unit measurement, listed in Table 1 as the maximum concentration, and the smallest reference area measurement, listed in Table 1 as the minimum background measurement, differ by less than the DCGL, the survey unit meets the release criterion. On that basis, these radionuclides also meet the release criteria.

Table 2. Radionuclide not in background and radionuclide-specific measurements made:

Survey Result	Conclusion
All measurement less than DCGL	Survey unit meets release criterion
Average greater than DCGL	Survey unit does not meet release criterion
Any measurement greater than DCGL and the average less than DCGL	Conduct Sign test and elevated measurement comparison

Table 3. Radionuclide in background or radionuclide non-specific (gross) measurement made:

Survey Result	Conclusion
Difference between largest survey unit measurement and smallest reference measurement is less than DCGL	Survey unit meets release criterion
Difference of survey unit average and reference area average is greater than DCGL	Survey unit do not meet release criterion
Difference between any survey unit measurement and any reference area measurement greater than DCGL and the difference of survey unit average and reference area average is less than DCGL	Conduct WRS test and elevated measurement comparison

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